

III. REQUEST FOR RECONSIDERATION UNDER 37 C.F.R. §1.111

A. Status of the Claims

Claims 1 and 10-32 were pending in the case at the time of the Action. Claim 1 was canceled herein as drawn to non-elected subject matter. Claims 10-32 are now pending in the case and are presented for reconsideration.

B. Status of the Specification

The title and abstract of the disclosure have been amended to correspond to the instantly claimed subject matter. The priority claim has been amended to reflect the status of the parent application and to correct minor clerical errors.

C. Status of the Drawings

Formal drawings have been submitted herewith pursuant to the Draftperson's Notice.

D. Status of the Information Disclosure Statement

The Action indicates that references for which the citation is not complete or that are not suitable documents for publishing on the face of the file have not been considered. For example, references on pages 6-9 of the IDS and at various other locations were indicated as not considered. Applicants respectfully request that these items be considered by the Examiner. The information in the subject PTO form 1449 is complete and was submitted in compliance with 37 C.F.R. § 1.98. The rules provide for the submission of “[a] list of all patents, publications, applications, *or other information* submitted for consideration by the Office.” (emphasis added) 37 C.F.R. §1.98(a)(1). The Office must therefore consider the “other information” provided by

Applicants, even if it is not suitable for publishing on the face of the file or does not have a publication date, author or other characteristics of a publication. Applicants therefore respectfully request that all remaining items listed in the PTO-1449 submitted with the IDS be considered and an initialed copy of the form be included in the file.

Applicants also note that the European patent documents on page 3 of 57 of the Form 1449 appear to have inadvertently not been lined through as considered. Confirmation that these have been considered is respectfully requested to clarify the record.

E. Rejections Under 35 U.S.C. §103(a)

(1) The Action has rejected claims 10-24, 26-27 and 29-32 under 35 U.S.C. 103(a) as being unpatentable over Tomes *et al.* (U.S. 5,886,244, filed June, 1988) in view of each of Barton *et al.* (1987, *Plant Physiol.* 85:1103-1109), Vaeck *et al.* (1987, *Nature* 328:33-37) and Adang *et al.* (1985, EP 142,924). In particular, it is stated that Tomes *et al.* teaches creation of transgenic maize, but not a method of transformation of maize by microprojectile bombardment with a nucleic acid encoding a *Bacillus thuringiensis* endotoxin, wherein the nucleic acid is adjusted to be more efficiently expressed in maize. The Action, however, states that Barton *et al.* and Vaeck *et al.* teach tobacco plants transformed with a vector encoding a truncated Bt. It is thus concluded that, at the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the transformation of Tomes *et al.* for introduction of nucleic acids encoding the truncated HD-1 or HD-73 Bt endotoxins according to each of Barton *et al.* and Adang *et al.* (1985) or fused in frame with a selectable marker or reporter gene, as described in Vaeck *et al.* Applicants respectfully traverse.

The cited references fail to teach all elements of the claims and fail to demonstrate that one of skill in the art would have had a reasonable expectation of success in arriving at the invention as required under 35 U.S.C. §103. In *Adang v. Fischhoff*, the Federal Circuit considered whether a patent application disclosing transgenic tobacco plants encoding Bt and exhibiting toxicity to Lepidopterans was enabling for insecticidal tomatoes expressing a full length Bt when combined with contemporaneous publications and a citation in the application to a method for transforming tomatoes. *Id.* at 1350. The application at issue was apparently a CIP of the U.S. application that corresponds to the Adang European counterpart application (EP 142 924) cited in the instant rejection. *Id.* at 1349.

Citing evidence submitted by the patent owner showing that bioassays could vary even among different strains of tobacco, the Federal Circuit found evidence of non-enablement in the findings of the Board of Patent Appeals and Interferences, holding these to have been supported by substantial evidence. *Id.* at 1360. The Federal Circuit cited the conclusion of the Board that:

persons skilled in the art *would not have expected success* in regenerating tomato plants insecticidal to Lepidopteran insects from dicotyledonous tomato plant cells transformed by a full length Bt crystal protein gene based on evidence that tobacco cells had been successfully transformed by the same genetic construct and one strain of dicotyledonous tobacco plants insecticidal to Lepidopteran insects had been regenerated therefrom. (emphasis added) (*Id.* at 1350)

The court therefore found a lack of enablement. Evidence regarding the unpredictability of expressing Bt genes and foreign genes in general in plants was considered in the decision. Specifically cited was the evidence that gene expression in one strain of tobacco is not necessarily predictive even of expression in other strains of tobacco, let alone other plants such as tomato. *Id.* at 1356. The court therefore found it “reasonable to conclude that those of skill in the art would not have expected expression in tomato plants to track that in a particular strain of tobacco.” *Id.* Contemporaneous references discussing expression of Bt in tobacco, including the

very Adang, Barton and Vaeck references cited here, were not found to cure any defects in enablement. *Id.* at 1357-58. The court further held that citation to a general method for transformation of tomato did not remedy the deficiencies of the Adang patent application, given the unpredictable nature of the claimed subject matter. *Id.* at 1358.

The same comparison as in *Fischhoff* is presented here. No examples of insect resistant maize plants expressing Bt have been cited. Each of Barton, Adang and Vaeck are cited only as teaching tobacco plants transformed with truncated Bt. The Action nonetheless states that these references would provide a motivation to transform maize with truncated Bt. However, as set forth in *Adang v. Fischhoff*, success in tobacco does not provide enablement or a reasonable expectation of success in tomato, let alone maize. Neither does citation to a reference alleged to provide a general method of transformation. Both tobacco and tomato are dicotyledonous plants, whereas maize is a monocotyledonous plant. Maize is therefore further genetically diverged from either of these plants than tomato is from tobacco. The inability to track success in tobacco to maize is therefore even more extreme than in the case of tomato.

In the instant rejection, Tomes *et al.* is the only reference cited as teaching transformation of maize. However, the reference only provides actual examples of transgenic tobacco, and transgenic maize cells, not fertile transgenic maize plants. Applicants therefore submit that the reference is not enabling for production of transgenic maize, not to mention insecticidal maize expressing a modified Bt. Still further, the failure to teach transgenic plants, let alone transgenic plants capable of expressing any given transgene, leaves one of skill in the art completely without guidance as to the ability to express Bt in maize and transgenes in general. Even if it is assumed, *arguendo*, that Tomes teaches a method for transforming maize, the mere citation of a

general transformation method neither enables production of insect resistant maize nor demonstrates the necessary reasonable expectation of success under 35 U.S.C. §103. *Id.* at 1358.

In view of the foregoing, removal of the rejection under 35 U.S.C. §103 is respectfully requested.

(2) The Action next rejects claim 25 under 35 U.S.C. 103(a) as being unpatentable over *Tomes et al.* (U.S. 5,886,244, filed June, 1988) in view of each of *Barton et al.* (1987, *Plant Physiol.* 85:1103-1109), *Vaeck et al.* (1987, *Nature* 328:33-37) and *Adang et al.* (1985, EP142,924), in further view of *Adang et al.* (U.S. 5,380,831, filed September, 1988). In particular, it is stated that *Adang et al.* (1988) teach a method of codon optimization of *Bt* endotoxin genes, wherein the method is applied to optimization for expression in monocots like maize, and that, at the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the method of transformation of maize by microprojectile bombardment with a nucleic acid encoding a *Bt* endotoxin taught by *Tomes et al.* in view of each of *Barton et al.* and *Adang et al.* (1985). Applicants respectfully traverse.

Claim 25 is dependent upon claim 10, and therefore incorporates all of the limitations of this claim. The rejection has not been applied to claim 10 and no indication has been made that the instant rejection adds anything with respect to the rejection of claim 10. Applicants therefore respectfully submit that the instant claim is not obvious over the cited references for all of the reasons set forth above.

In view of the foregoing, removal of the rejection is respectfully requested.

(3) The Action next rejects claims 10-15, 18-24, 27, 29 and 31-32 under 35 U.S.C. 103(a) as being unpatentable over each of *Klein et al.* (1989, *Plant Physiol.* 91:440-444), *Klein et al.* (1988a, *Proc. Natl. Acad. Sci. USA* 85:4305-4309), *Klein et al.* (1988b, *Bio/Technol.*

6:559-563) and Sanford *et al.* (US Patent 5,036,006, filed June, 1986) in view of Shillito *et al.* (US Patent 5,350,689, filed November, 1988). Applicants respectfully traverse.

Applicants again note that none of the references provide the necessary expectation of success in arriving at the invention, nor has it been shown that all elements of the claims have been provided by an enabling method for maize transformation. The Action acknowledges that none of Klein *et al.* 1989, Klein *et al.* 1988a, Klein *et al.* 1988b and Sanford *et al.* disclose maize cells transformed with a modified Bt and regeneration of plants therefrom. It further has not been directly alleged that any of these references teach a method for the creation of fertile transgenic plants. It is only stated that these references teach transformation of maize cell. To the extent that it is being asserted that any of the cited references enable the production of fertile transgenic maize and the rejection is maintained, Applicants respectfully request that the basis for the allegation be fully set forth on the record so that an adequate response may be made.

With respect to Shillito, it is noted that the portion of the reference cited as teaching producing progeny from regenerated, transformed maize plants (Col. 21, lines 16-30) is entirely prophetic. No transgenic maize plants are described. Applicants respectfully submit this is because Shillito is not enabling and does not disclose any cell lines capable of being transformed and regenerated into fertile transgenic maize plants. Applicants therefore respectfully submit that the rejection does not recite all elements of the claims, *e.g.*, an enabling method for transforming maize.

The Action cites Shillito as teaching vectors comprising the N-terminal 50% of the Bt endotoxin and states that these vectors “would more efficiently express the endotoxin in maize.” No basis has been provided to conclude why one of skill in the art, at the time the application was filed, would have believed this to be true and have had a reasonable expectation of success

with regard to the claimed invention. Hindsight reconstruction is impermissible. The motivation and reasonable expectation of success must be found in the prior art. Applicants respectfully submit that the necessary motivation and expectation of success are absent from the prior art. Removal of the rejection under 35 U.S.C. §103 is therefore respectfully requested.

F. Rejection of Claims Under the Judicially-Created Doctrine of Obviousness-Type Double Patenting

(1) The action has rejected claims 10-32 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-33 of U.S. Patent No. 6,331,665. In particular, it is stated that, although the issued patent does not claim a method of producing maize plants by microprojectile bombardment, it teaches the method in column 29, line 25, to column 30, line 50. Applicants respectfully traverse.

All that is properly considered for purposes of double patenting is what is claimed in the cited patent. An obviousness-type double patenting rejection is "analogous to [a failure to meet] the nonobviousness requirement of 35 U.S.C. 103" except that the patent principally underlying the double patenting rejection is not considered prior art. MPEP §804; *In re Braithwaite*, 379 F.2d 594, 154 USPQ 29 (CCPA 1967). Here, the rejection relies on the specification of U.S. patent number 6,331,665 to support the rejection. A basis has not been provided to support the double patenting rejection absent reliance on the cited portions of the specification. As the teachings in the specification may not be considered prior art for purposes of an obviousness-type double patenting the rejection and no other basis has been provided that can support the rejection, removal of the rejection is respectfully requested.

(2) The Action also rejects claims 10-15 and 18-32 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of U.S. Patent No. 5,484,956 in view of Adang *et al.* (US 5,380,831, filed September, 1988). In particular, it is stated that the issued patent does not claim a method of transformation of maize by microprojectile bombardment with a nucleic acid encoding a *B. thuringiensis* endotoxin, wherein the nucleic acid is “adjusted” to be more efficiently expressed in maize, but that this is taught in the specification and the claims would therefore be obvious in view of Adang *et al.*

In response, Applicants again respectfully note that the rejection relies on teaching in the cited patent specification to support the rejection. Only the claims portion of U.S. Patent No. 6,331,665 may be used as prior art in support of an obviousness-type double patenting rejection. The Action has acknowledged that the issued patent does not claim a method of transformation of maize by microprojectile bombardment with a nucleic acid encoding a *B. thuringiensis* endotoxin, wherein the nucleic acid is “adjusted” to be more efficiently expressed in maize. The patent specification is relied upon to cure this defect. The obviousness-type double patenting rejection has therefore not been supported as required. Removal of the rejection is thus respectfully requested.

G. Conclusion

In light of the foregoing, applicants submit that all claims are in condition for allowance, and an early indication to that effect is earnestly solicited. The examiner is invited to contact the undersigned (512)536-3085 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,



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APPENDIX A: MARKED UP COPY OF AMENDMENTS

In the Specification:

Please replace the paragraphs at page 1, lines 1-8 with the following:

--INSECT RESISTANT FERTILE TRANSGENIC CORN PLANTS

Cross Reference to Related Applications

This Application is a divisional of U.S. patent application Serial No. 08/619,077, filed March 20, 1996, now U.S. Pat. No. 6,331,665; which is in turn a divisional of Serial No. 08/285,488, filed August 3, 1994, now U.S. Pat. No. 5,508,468; which is in turn a continuation of Serial No. 07/636,089, filed December 28, 1990, abandoned; which in turn is a continuation-in-part of Serial No. 07/508,045, filed April 11, 1990, U.S. Pat. No. 5,484,956;[,]which is in turn a continuation in part of Serial[.] No. 07/467,983, filed January 22, 1990, abandoned; and this application is also a continuation-in-part of U.S. patent application Serial No. 08/677,695, filed July 10, 1996.--

Please replace the paragraph at page 84, lines 3-7 with the following:

--Fertile transgenic Zea mays (corn) plants which stably express recombinant DNA which is heritable are provided wherein said DNA preferably comprises a recombinant gene which encodes a Bacillus thuringiensis endotoxin [seed storage protein], so as to impart insect resistance to the fertile transgenic plants[that the amino acid profile of the corn is improved].--